



Longview Fern Foundation Quarterly



Fall 2015

THE HARDY FERN FOUNDATION

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The Hardy Fern Foundation was founded in 1989 to establish a comprehensive collection of the world's hardy ferns for display, testing, evaluation, public education and introduction to the gardening and horticultural community. Many rare and unusual species, hybrids and varieties are being propagated from spores and tested in selected environments for their different degrees of hardiness and ornamental garden value.

The primary fern display and test garden is located at, and in conjunction with, The Rhododendron Species Botanical Garden at the Weyerhaeuser Corporate Headquarters, in Federal Way, Washington.

Affiliate fern gardens are at the Bainbridge Island Library, Bainbridge Island, Washington; Bellevue Botanical Garden, Bellevue, Washington; Birmingham Botanical Gardens, Birmingham, Alabama; Coastal Maine Botanical Garden, Boothbay, Maine; Dallas Arboretum, Dallas, Texas; Denver Botanic Gardens, Denver, Colorado; Georgia Perimeter College Garden, Decatur, Georgia; Inniswood Metro Gardens, Columbus, Ohio; Lakewold, Tacoma, Washington; Lotusland, Santa Barbara, California; Rotary Gardens, Janesville, Wisconsin; Strybing Arboretum, San Francisco, California; University of California Berkeley Botanical Garden, Berkeley, California; and Whitehall Historic Home and Garden, Louisville, Kentucky.

Hardy Fern Foundation members participate in a spore exchange, receive a quarterly newsletter and have first access to ferns as they are ready for distribution.

Cover design by Willanna Bradner

HARDY FERN FOUNDATION QUARTERLY

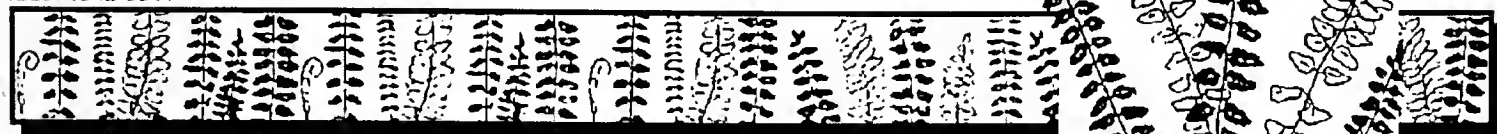
THE HARDY FERN FOUNDATION QUARTERLY

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*Thank you to Willanna Bradner and Buz
Smith for their membership renewal, at
the \$1,000 Patron level!*

President's Message ~ Fall 2015

During my recent visit to our HFF affiliate garden, Whitehall House and Gardens in Louisville, KY, I was struck by the dedication and enthusiasm these gardens have for their partnership with our organization. The Landscape Director of Whitehall, Mike Hayman, arranged for my visit and I am grateful for the time he spent to make it a memorable and fun filled experience. In this issue Mike shares the successes and progress of the gardens at Whitehall. This was my second time visiting this historic estate and I had the pleasure of once again meeting and touring the fern garden with Ralph Archer, the creator of the woodland and fern garden. Although Ralph is no longer active in maintaining the garden, it has passed to the hands of a remarkable group of volunteers and dedicated Master Gardeners who have built on his solid foundation. I would encourage any of our members to check out our affiliate garden list on the website and plan a visit to these gardens if you are in the area.

With autumn well underway I have been busy raking leaves and cutting back the collapsed fronds of my deciduous ferns, as well as contemplating several new fern plantings around the garden. One of our rarest ferns *Blechnum discolor*, was recently declining in its pot, so I made the decision to plant it in the garden where it "should be hardy" in our mild maritime Pacific Northwest climate. This New Zealand native has the appearance of a giant deer fern (*Blechnum spicant*) with beautiful dark green foliage and a silvery underside that gives a flash of brilliance on a breezy day. So far it looks much better and I will keep a close eye on it through the winter and add a little protection if needed. It is always rewarding to add another new fern to the garden. This is very much the case for the article on *×Cystocarpium roskamianum*. This newly named, chance discovery made the news this summer for its unique hybrid origin. If you missed the news reports make sure to read the article, it is a fascinating story. Perhaps one day we will be able to add this unusual oddity to our home gardens.

Finally, I would like to thank all of the members who attended the Fern Fall Social at the Bellevue Botanical Garden on October 10th. Sue Olsen gave an interesting lecture highlighting ferns from her trips around the world and several board members contributed to the fall frond display featuring foliage from 140 different species and cultivars. Thank you is also in order for our immediate past president, John van den Meerendonk. In August following a tour of our Bainbridge Island Library garden John hosted a brunch at his home garden followed by a tour of one of the most spectacular gardens of the West Coast, the Bloedel Reserve. We appreciate John's generosity and his willingness to share his knowledge of ferns and other plants along with his historical insight to this beautiful garden.

I hope all of our members find this autumn colorful, crisp and find joy in preparing the garden for a winter slumber.

All the best,
Richie Steffen, President, Hardy Fern Foundation

Blechnum niponicum, Japanese deer fern

James R Horrocks

Salt Lake City, UT

The genus *blechnum* has been assigned in the past to other genera such as *Lomaria*, *Struthiopteris*, *spicantopsis*, etc. The epithet “*niponicum*” refers to its Japanese origin although it is also found in China and Korea in wooded mountainous areas. It is a medium sized terrestrial fern requiring the same moist acidic soils that its North American counterpart, *B. spicant* relishes. Martin Rickard notes that “Some plants from the Pacific north-west of America show similarities to this species (*B. niponicum*) and may prove to be the same.” (I wonder if any serious research has been done on this.) *B. niponicum* and *B. spicant* have similarities but the latter has much taller fertile fronds and the sterile fronds are narrower and held more erect and somewhat arching as opposed to *B. niponicum* being nearly prostrate to the ground. *B. niponicum* uniquely displays a brilliant pink new growth in the spring. In the orient, *B. amabile* may pose some confusion but it has a creeping rhizome rather than erect and the sterile fronds are narrower and the fertile fronds shorter. *B. niponicum* has a dwarf form Var. “*minima*” endemic to Japan.



Description: The rhizome is short, erect to ascending and densely scaly, giving rise to a rosette of mostly prostrate, evergreen, once-pinnate fronds 8 to 14 inches long. As has been mentioned, the new growth in spring is described as “brilliant pink” fading to a matte green as the season proceeds. The stipe is very short, practically non-existent, the lowest pinnae being ¼ inch in length. Scales are present at the base, being linear and dark brown with a narrow pale margin. The sterile fronds are oblanceolate to oblong-oblanceolate, the pinnae being broadly linear and the frond widest just above the middle, tapering toward each end. The apex consists of an abruptly contracted linear subacute tail. Being dimorphic, the fertile fronds are slightly longer, 12 to 20 inches, with a longer stipe almost ¼ the length of the frond, in some specimens, longer. The fertile pinnae are narrower and more distant, the sori running the entire length, although the lowest few pairs are sterile. The fertile fronds are deciduous.

Culture: The Japanese deer fern is hardy to zone 6 and is described as temperamental when young, but if finally established, it is a charming and lovely attraction in the woodland garden. It is not considered especially easy to grow, perhaps “moderate” as John Mickel states, and is very likely at its best in a cooler humid climate. It is not particularly easy from spore either and resents being transplanted, especially if already well established. A moist humus-rich, peaty soil is to its liking which it hugs with its quaint spreading rosette of leathery green fronds.

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Woodland Garden Whitehall House and Gardens

Michael Hayman ~ Louisville, KY

We were inspired to create a fern Stumpery at Whitehall because we already had the stumps. Trees had fallen in our woodland and we did not have the money to remove them. It didn't take much of a leap to see them as backdrops for ferns. Some of those large oak logs looked substantial, but rotted away in several years. By then we had become dependent on them as natural sculpture so we began looking for more durable trunks.

We found eastern red cedar (*Juniperus virginiana*), black locust (*Robinia pseudoacasia*), and osage orange (*Maclura pomifera*) were durable so, for the first time, we brought new logs to the Stumpery. (see photo page 74) Most of these came from our contacts with tree removal companies. Large, sculptural stumps became the anchors, the hardscape, of the woodland garden. We also added dogwood (*Cornus florida*) and mulberry (*Morus rubra*) trunks, a second tier of durability. We are slowly changing our dominant canopy trees from cherry/sugar maple to oak/hickory.



Installing red cedar (*Juniperus virginiana*) stumps at Whitehall without machinery.

Photo courtesy of Michael Hayman

The cherries and maples are weedy and shallow rooted, competitive with the woodland plants. This effort is a change of the mix, not a complete elimination of cherries and maples.

Our ferns have been relatively immune from rabbit damage, but the companion woodland plants have not been. Some woodland species were entirely destroyed by rabbits so we acquired two rescue cats, Grady and Tisha. The rabbits moved out of the fern garden immediately. The cats are fed twice a day, given annual vet care, and live in our red cedar tool house with a cat door, a cat porch, a cat window, a cat heater, and cat attic.

Whitehall's neighborhood has been built up for 60 years so it was a surprise and disappointment for us to discover deer damage. The damage was especially severe in the cold winter of 2013-14. Our cats are too small to solve that problem, and cougars aren't allowed in the city, so we are gradually extending our 8' fences to the entire property. Whitehall's gardens were in Zone 6, creeping toward Zone 7, but then we had two cold winters that put us back into Zone 6 for the two most recent years. The winter of 2013-14 had sustained temperatures from -10 F. to 0 F. degrees. Summers here in the Ohio River valley are hot and humid.

Our soil tends to be alkaline Ph 7-7.5. There has been very little soil disturbance in our small woodland so generally we have humus rich soil. To rid ourselves of an invasive *Euonymus* ground cover, we covered the ground with cardboard and one foot of mulch, suffocating the offending plants and giving us even better soil. Most of the ferns came from Ralph Archer for whom the garden is named. Most of the maintenance is done by the Jefferson County Master Gardeners. The Master Gardeners also paid for the labels.

Beginning in 2007, Whitehall held five Fern Festivals with Sue Olsen twice, Judith Jones, Richie Steffen, and hosted the British Pteridological Society/HFF Southeast USA Fern Tour

Status of ferns from HFF distribution 2010 - 2014:

Thriving

Cyrtomium lonchitoides
Dryopteris cycadina
Dryopteris formosana
Dryopteris namegatae
Dryopteris tokyoensis
Osmunda regalis 'Cristata'
Phyllitis scolopendrium
'Angustifolium'
Polystichum x dycei
Polystichum neolobatum
Adiantum x mairisii
Dryopteris bissetiana



Richie Steffen teaching fern ID to Jefferson County Master Gardeners at the Whitehall Fern Fest June, 2015.

Photo courtesy of Michael Hayman

Mixed Results

Dryopteris wallichiana
Dryopteris koidzumiana (z7)

Expired

Adiantum aleuticum 'Subpumilum'
Blechnum novae-zelandiae (z7)
Polystichum xiphophyllum (trying again)
Pyrrosia sheareri (z7)
Woodwardia unigemmata (z8)

In addition to the zone 6 ferns listed by Ralph Archer, in Appendix 4 of "The Encyclopedia of Garden Ferns" published in 2007, others that have done consistently well are *Polystichum x dycei*, *Arachniodes standishii*, *Dryopteris championii*, *Phegopteris hexagonoptera*.

Japan Fern Trip conclusion

Monday 27th October –

Kyoto to Kawakami, Lizzie Evans

We left the hotel at 8.15am prompt to walk around the corner to Shin-Yokohama railway station to catch the 8.49am “Shinkansen” bullet train to Kyoto. The train was perfectly on time, and although it was incredibly spacious compared to trains in England the rapid boarding time made us very grateful that our suitcases had been transferred to the next hotel ahead of us.

We arrived at Kyoto after a very comfortable 2 hour journey, and found plenty of places to choose from to get our lunch for the next leg of the journey onwards to the Kumano Kodo region. We boarded another very comfortable train on the Kintetsu line to Yamoto-Kamitchi station, making one change along the way. We were once again very grateful to have the help of our guides to navigate our way through the railway station, although the signs were given in both Japanese and English.

Once out of the big city of Kyoto we started noticing a change in the landscape, and when we boarded the final train we really began to feel as though we were in a more rural area, with a more rugged countryside and traditional looking houses.

When we arrived at the last station of our journey we were greeted by Mr. Ichiro Yamazumi, our guide for the Kumano Kodo region. The hotel shuttle bus conveyed us to our hotel, Suginoyu Kawakami Onsen Hotel, in the small village of Kawakami. The Kumano Kodo is a beautiful region of walking trails, selected as a Unesco World Heritage Site. It was explained on the way to the hotel that there would soon be a water festival held here (in early November) and the road was being improved so that the Emperor and Empress of Japan could visit the hotel and take part in the festival.

As soon as we arrived at the hotel we were impressed with the view of mist-shrouded, tree-covered mountains rising above a green-blue lake, and although it was raining quite heavily, one brave group decided to squeeze in a couple of hours ferning before our evening meal. Just in the area nearby the hotel they spotted in the region of 30 species, many of which we have already encountered, but also adding some new species to the list including *Coniogramme intermedia*, *Arachniodes simplicior*, and *Dicranopteris linearis*.

We had a choice when booking the hotel between Western style or traditional Japanese style rooms, and I have to say the Japanese style was one of the most comfortable rooms I have ever stayed in! At 6pm we were treated to a traditional Japanese meal of numerous exquisitely presented courses, all themed around fish. It was a real Japanese experience! After dinner we were given a talk about the Kumano Kodo region – including warnings about some of the dangerous creatures we might encounter – and we went to bed that night excited at the prospect of the next day’s exploration.

Tuesday 28th October

Pat Acock

We took about an hour's journey climbing eventually in a narrow gorge along the Sannoko River to where we parked the coach (34°15'33.6"N, 136°05'49.0"E) and met up with another 3-4 Japanese park/natural history personnel. Mr. Yamazumi and Ms. Seiko Onoue were staying with us for this leg of the journey in the beautiful Kumano Kodo region and so with 5-6 people we were well supported with identification of the plants and the logistics. Before setting off the youngest of the group led us through a small ritual at a roadside shrine. We were making our way along a narrow trackway across wooden bridges a few of which had been especially repaired for our visit to the Myojin Falls about 1km away through a primeval forest of *Pseudotsuga japonica*. Progress was slow since there were many new ferns to learn and many old ones to relearn. The ferns were really special and the first to delight me was *Monachosorum maximowiczii* which formed dense clumps on rocks. *Plagiogyria japonica* and *P. euphlebia* were seen along with their hybrid. Aspleniums were in abundance among which were *A. trichomanes*, *A. normale*, *A. yoshinagae* and *A. tenuicaule*. (see photo page 75) We were pointed out the quite rare *Polystichum igaense* which we had missed on the way out to the waterfall and there were at least 5 filmy ferns including *Hymenophyllum barbatum*, *H. polyanthos*, *H. flexile* and *Crepidomanes (Trichomanes) minutum*. (see photo page 74) It was also nice to see *Dryopsis maximowicziana*. We were eventually hurried along the trail to the lunch spot with the promise of a good long time on the way back but despite a short lunch it was all still a rush and we were hurried along again. We fitted in an extra stop by a bridge to see *Osmunda lancea*, having only seen the hybrid with *O. japonicum* and *O. lancea* before. Our last stop was by a side gorge (34°18'01.4", 136°00'13.7") to the one we were in, dusk was approaching and there were many wonders to see. Walking back in the gathering gloom we saw *Neolepisorus ensatus (Neocheiropteris ensata)*, *Adiantum monochlamys*, *Dryopteris sabaei*, and most of the group were fortunate to see *Rhachidosorus mesosorus*. This was another splendid day with many new genera and a day with a whole host of species many of which were new to us.

Wednesday 29th October – Mifuni no Taki Region

Alison Evans

We started our hike along a track to the Mifune Falls (34°20'37.0", 136°00'30.8"E). As usual in a new location, ferners scattered in all directions, so it took some persuasion on Asher's part to shepherd us across a wooden bridge to the first two of the star ferns of the day – the lovely little hairy *Pleurosoriopsis makinoi* growing on a rock at a convenient height for photography, and *Polypodium faurei*. A short walk up hill was rewarded by a view of the waterfall, cascading over rocks between trees turning to their autumn colours. Ferns were all around - *Athyrium clivicola*, *Arachniodes mutica*, *Monachosorum maximowiczii*, *Hymenophyllum barbatum*, and *Coniogramme intermedia* to name a few. We retraced our steps to the small road by the River Ikari, to walk downhill to Morimori-kan. We soon had some revision of polystichums, seeing *P. polyblepharum*, *P. ovatopaleaceum*, *P. pseudomakinoi*, and *P. retrosopaleaceum* all within a short distance of each other. Just as we were thinking we were sorting these out, Mr. Yamazumi showed

us three hybrids in fairly quick succession – *P. x amboversum*, *P. x hatajukuense*, and *P. x namegatae* – the latter conveniently growing next to both parents. There were so many things to look at that the group became very spread out, some people climbing down to the river gorge. Perhaps this was when the collective noun, a delay of Pteridologists, seemed most appropriate. Mr. Yamazumi pointed out a fourth *Polystichum* hybrid, *P. x ongataense*, the hybrid of *P. ovatopaleaceum* and *P. pseudomakinoi*. Our next star fern was *Woodsia manchuriensis* with several plants growing on the roadside bank. A little further on we found the ‘advance’ party sitting by the roadside having lunch, having not quite reached the intended lunch-time picnic place. We were briefly all together, but as the afternoon walk took us through woodland alternating with more sunny sites, it brought an even greater range of ferns and the group was soon widely dispersed again. Ferns of note here included *Monachosorum flagellare*, *Loxogramme grammitoides*, *Dryopteris dickinsii*, *Cornopteris decurrenti-alata*, and *Acystopteris japonica*.

We all gathered together again outside the café at Morimori-kan (34°19'38.2"N, 136°00'29.6"E), where the adventurous amongst us tried some dried venison, and crunchy black beans in brown sugar, whilst Kazuo caught a couple of fish in the river to help a fisherman who was struggling with arthritis. Mr. Yamazumi then said that there was *Pyrrosia linearifolia* a little way down the road, so a group of us set off to see it. The first clump we saw was way above our heads, so Asher climbed up the cliff to take a frond – then we noticed the plants within easy reach! We also saw *Deparia okuboana* and *D. orientalis*.

The second site on our itinerary for the day was Koudako (34°16'43.4"N, 135°58'38.8"E). A short bus ride took us to a small riverside track, then after a brisk walk past warning signs about bears and snakes we reached the target fern, *Micropolypodium okuboi*, growing on a rock face in very low light, along with *Hymenophyllum barbatum*. Tim noticed a little fern on the rock close by, which he identified as *Lepidomicrosorium buergerianum*. We later realised that it was a small plant of what our guides referred to as *Neocheiropteris subhastata*, which we were fortunate to see in well-grown colonies on our last hiking day near Kyoto. On our way back, our guide Miss Onoue showed us *Asplenium pseudowilfordii*, growing on a rock by the river. The light was fading as we walked back, but we still managed to record more than 50 species at this site, bringing the total for the day to around 96 taxa. Another amazing day!

Thursday October 30th – Shiraya deserted village and Seireinotaki Falls

Paul Ripley

We started with a very short drive up river and across to the other bank, where, 10 years ago, an entire village (Shiraya) (34°20'05.0"N, 135°57'59.3"E) was moved because of a landslip. It was terraced, south-facing, and a minor tourist attraction. Options had been kept open; working water taps had been newly fitted at every empty street corner.

The feature here was *Asplenium pekinense*, growing with *A. sarelii* and *A. incisum*. We were shown the hybrid between *A. sarelii* and *A. incisum*, but Pat cleverly found the hybrid between *A. sarelii* and *A. pekinense*. (see photo page 75)

Our main stop was the tourist site of the Seireinotaki (Dragonfly) Falls (34°21'16.4"N, 135°55'03.2"E) where from a flat grassy area, a steep stepped path led up to a beautiful three-staged waterfall. The site was heavily wooded but at lower altitude than the previous two days. Features of this site were *Arachniodes standishii*, *A. fargesii*, *A. borealis*, *A. chinensis*, *A. simplicior*, *A. amabilis*; all three plagiogyrias, *P. adnata*, *P. euphlebia* and the intermediate *P. japonica*; a very fine clump of *Neolepisorus ensatus*, and athyriums, including *A. clivicola*. A number of filmy fern species *Hymenophyllum barbatum*, *Crepidomanes latealatum*, *C. minutum*, *Vandenboschia hokurikuensis*, and *Hymenasplenium hondoense* also grew in damp places by the river.

Above the falls, *Dicranopteris linearis*, and *Diplopterygium glaucum* grew in a slightly drier area, but taking a higher lateral path, we found *Crepidomanes minutum*, *Pyrrosia lingua*, and unexpectedly, *Asplenium wilfordii*. Tim also found *A. pseudowilfordii* here.

On our way back just above our hotel was a museum of local history, and we were shown a diorama and a beautiful film illustrating life in the forest. The museum included information on prehistory, and details of more recent commercial exploitation of the forest. The *Pseudotsuga* trees are planted very close, and the subsequent slow growth leads to a dense wood which is highly prized. Among other things it is used for sake barrels, and pine needles were woven into a ball hoisted as a signal that the sake brew was ready.

The evening meal was another sukiyaki, but in our yukatas we were much more relaxed over cooking and eating of the thin slices of beef and assorted unidentified vegetables, all dipped in raw egg before eating. Including the scrambled egg sandwiches, the meal moved today's egg count to five.

Before finishing my account, I would like to record my personal thanks to our Japanese fern expert hosts, especially Mr. Yamazumi and Ms. Onoue who stayed with us at the hotel and other members of the Nippon Fernist Club who had prepared detailed and comprehensive illustrated notes of the area's ferns, and who with exquisite patience and kindness explained the identity and characters of ferns we had any difficulty with.

Friday 31st October - Kyoto, Yoshida Shrine

Tim Pyner

We spent the morning travelling to our next hotel in the city of Kyoto. Following our arrival several of us walked to a book fair being held in the gardens of a shrine. After a fruitless search for fern books I decided to walk to some forested hills visible in the distance and see if I could find some more ferns. After a few hundred metres I reached a wooded hill that had several shrines scattered through it. The wood was rather dry but ferns were frequent, the most common being *Dryopteris erythrosora*. More interesting finds included *Arachniodes borealis*, *Blechnum niponicum*, *Dryopteris hondoensis* and *Microlepia marginata*. I also came across *Plagiogyria japonica* which was rather surprising as previously I had associated this with much wetter forests. *Asplenium incisum*, *A. sarelii* and *Lemmaphyllum microphyllum* grew on walls.

Saturday 1st November - Uji Lectures and Final Banquet , Pat Acock

On Saturday we started out early by taxi to Kyoto Station where we had a little while to pick up our lunch before taking a train out to the suburbs to Uji (34°20'36.7"N, 135°57'18.3"E). Here we met 3 lovely ladies a young chap and the leader for the day along with our faithful host for this part of the tour Mr. Yamazumi. We took a bus with a host of school boys to the start of the trail and the rain.

It was not long before it was really quite wet but with the right gear there was not a problem. After a short walk down the lane, where there was another interesting subset of ferns including *Thelypteris angustifrons*, *T. glanduligera* and *T. acuminata*. We came to the temple where we waited for the others in a tourist shelter connected with the temple. The rain abated a while and we went up to see the temple. In a tree some distance from the ground we saw *Pyrrosia lingua*. Dropping out the other side on to a narrow path we walked above a stream where many ferns ensured that despite the constant drizzle and probably short distance we saw a whole host of ferns growing most luxuriantly. To start with we saw three interesting dryopteris to get to grips with *Dryopteris formosana*, *D. medioxima* and *D. sparsa*. *Dryopteris formosana* had been an interest of mine since I first saw a picture of in Barbara Jo Hoshizaki's and Ken Wilson's paper (Am F. J. 89: 1-98) *Dryopteris in Cultivation* and have tried to grow ever since without success. Other ferns were very large specimens of *Neolepisorus ensatus* (*Neocheiropteris ensata*) and *Lepidomicrosorium buergerianum* (*Neocheiropteris subhastata*) along with *Arachnioides amabilis* x *A. aristata* which although I had heard was along the trail found for myself. We reached a road where we had lunch before going up the road to one of the biggest temples in Japan where coach loads of people were turning up. We saw a new *Dryopteris*, *D. kinkiensis* in the temple grounds along with many favourites. We returned by local train and underground to the hotel where we had 30 min to get ready for the afternoon lectures. The three talks were very informative and diverse. One presented by Dr. Kato on the *Osmunda japonica*/*O. lancea* complex, one presented by Dr. Suzuki on ethnopteridology and one by our illustrious host of the last few days Mr. Yamazumi. Mr. Yamazumi had raised haploid ferns straight from the gametophyte in *Dryopteris* and was taking this work on to the research of the polyploids of *Dryopteris* and *Osmunda*. We then had an hour to pack our bags to get them on the carrier to be taken to the airport. The evening meal was our final one all together at a special hotel which served a full Japanese meal. Some of our helpers over the last few days joined us for this banquet which was tinged with sadness at parting from people whom we had grown so fond of.

Sunday 2nd November - Kyoto Botanic Gardens, Pat Acock

We decided to go to the botanic gardens in the morning. 4 took a taxi, Paul, Lindsey, Grace and I took the underground. The botanic gardens were very fine but needed more things labelled. It rained while we were in the conservatory so we waited until it stopped before returning to the hotel for a meal. Grace and I went into Kyoto after saying goodbye to the British contingent that had to stay in the airport hotel to be sure to catch the flight first thing in the morning. The Americans, Australians and us had a meal altogether and

had an early night.

Monday 3rd November, Pat Acock

The rest of the party said goodbye to Kazuo thanking him once more for all his hard work. Asher accompanied us back to Tokyo on the bullet train and led us down to the right platform for our train to the airport from which we dispersed. Ironically our aeroplane landed back in Kyoto to take on fuel!

Conclusion, Pat Acock

We must thank Pat Riehl and husband Walt for seizing the opportunity of this exciting and truly wonderful excursion to Japan as well as Marilyn and Kazuo Tsuchiya who put it all together. To Kazuo and Asher our leaders on the tour for all their diligence in ensuring we had a real Japanese experience and sorting out problems as they arose with such grace. Most of all for the richest of fern experiences Mr. Taketoshi Oka and Mr. Ichiro Yamazumi and Ms. Seiko Onoue and all their colleagues for all their hard work in ensuring we all had the most rich of fern experiences



Martin Rickard and Dan Yansura



The Bloedel Reserve

Bainbridge Island, WA

Photo left courtesy of
Sue Olsen

Osage orange, *Maclura pomifera* rot resistant logs.

Photo right courtesy
of Michael Hayman



Hymenophyllum barbatum

Photo left courtesy of
Dan Yansura



Loxogramme duclouxii

Photo right courtesy of
Pat Acock





**The Whitehall
Fern discovered
by the travelers
on the SE US
bus tour**

Photo left courtesy of
Michael Hayman

**A hybrid between
A. pekinense and
*A. sarelii***
Photo right courtesy of
Pat Acock



Perry Creek, Granite Falls, WA
Photo left courtesy of
Jo Laskowski



Asplenium normale

Photo right courtesy of
Dan Yansura



A Confession

Jo Laskowski

Seattle, WA

Pssst! Sometimes do you just want to not do that one more tour, not see that one more garden? Feeling a little jaded? A little dissipated? Malaise? You're not alone. Plant lassitude comes over us all, from time to time, for various reasons. Mine flashed this summer as I struggled with uncharacteristically hot temperatures that nobody in their right mind should admit to enjoying. Slowly but surely I began to get surly. Short-tempered. Snarly. Downright snarky, some even said.

So when I arranged to attend a garden tour hosted by the immediate past-president of the Hardy Fern Foundation board, I admit I did gnash my teeth, ever so slightly. This lassitude was happening at the wrong time! John van den Meerendonk had just completed his three-year term, and had graciously invited board members and membership to come to a brunch at his Bainbridge Island home. It would be preceded by a tour of his installation at the island's regional library, and followed by a guided tour of Bloedel Reserve, a 150-acre property and forest preserve just minutes from his house. (see photo page 74)

John has been a landscaper for a while. It turns out that he had begun his career at Bloedel, when it was morphing from a private estate into the public garden that it is today. We'd spend time there looking at the Bird Marsh, the Reflection Pool Garden, the Woodland Garden, the Japanese Garden, the Glen, the Moss Garden, the Edwardian landscape surrounding the main residence of the former owners.

I floated absently along in the group that assembled at the library, and we looked at the perennial plantings and the Japanese courtyard. By the fern installation my ears started perking up at John's stories. Brunch at John's house was a glorious affair. We sat on the patio, looking down through Doug firs to the beach below us. The sun was out. We noshed and chattered and strolled John's plantings. I wasn't gnashing.

At Bloedel Reserve we strung out in a long, sloppy line as we followed John. The invitation had stipulated to plan for three hours—this was a big place! John's stories were getting more interesting. By the time we were winding down our trek it had, indeed, been over three hours.

I could have walked away with a huge, long list of the trees and ferns and etceteras that we'd seen. I could have noted that this something was the biggest, or that that something was the rarest. I might have walked away cranky with how long it took. But guess what?

The sojourn had been peppered with the kind of information that I love—the backstory, what you could only hear from someone who had been involved with the conversion of the estate. And cared. John spoke easily and in detail and color about the designers

and crews and events that were part of it. He spoke knowingly of all the plants he did name, sometimes like old friends, and there were many.

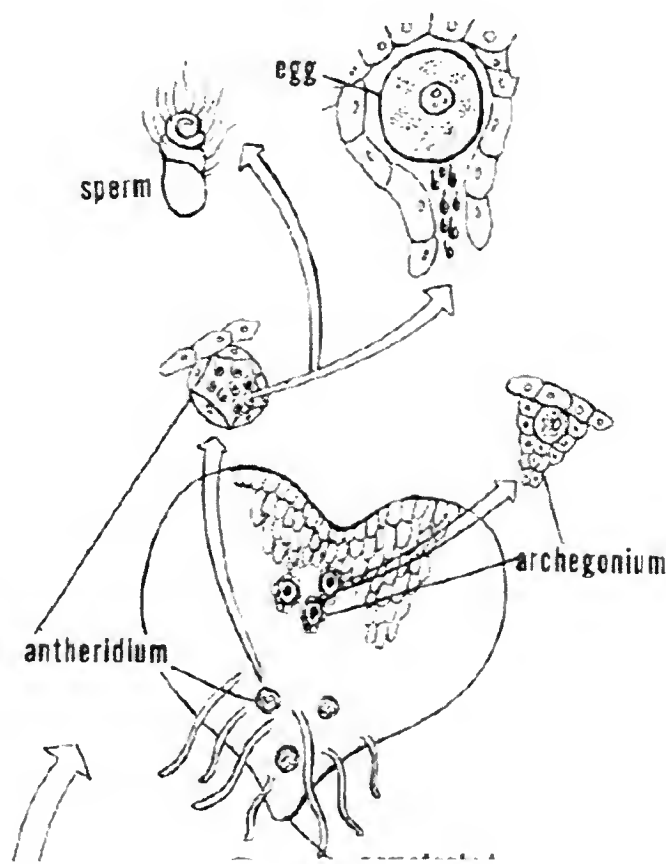
Some days later I was talking to a woman who'd been on that tour. Eventually we got around to talking about it. She had been quite impressed; she remarked that she hadn't even known about the extensive gardens at the library before. She spoke of John's character, and of how the "house inside had a 'good feeling'—not all museums do." The Bloedel mansion and many original furnishings have been preserved as a visitor center. Its vast collection of accessible botanical books in its side rooms positively radiates warmth and invitation.

John's contagious enthusiasm and incredible catalogue of details put a lot of meat on the bones of the tour. He certainly turned "yet another garden tour" into something much different for this jaded author. Isn't it amazing what hot weather and a garden tour can make you think of?

Fern Sex After 60 Million Years Of Separation

Joan Eiger Gottlieb ~ Pittsburgh, PA

Imagine my delight when I heard Dr. Carl Rothfels (fern researcher at the University of California, Berkeley) being interviewed by science reporter Geoff Blumfiel (National Public Radio, Feb. 24, 2015) about a study Rothfels headed on a recently discovered intergeneric fern hybrid - *xCystocarpium roskamianum* (xC.r.).* According to Rothfels, DNA analysis confirmed that the parent genera "had been evolving independently for about 60 million years before they got back together again and were able to form this hybrid." Putting it all in perspective with some well-placed humor, Blumfiel noted that humans and lemurs have been separating from their common primate ancestor for about the same amount of time, but, "we definitely cannot make little baby 'lemans'." Not missing a beat, Rothfels added, "Another comparable example would be an elephant mating with a manatee." Blumfiel, staying in the jocular mood, named the theoretical offspring of such a match an '*elephanatee*'.



From spores to gametes: the gametophyte (sexual) stage of a typical fern

Drawing courtesy of J.E. Gottlieb

At last, I rejoiced, a FERN was receiving attention from a major media outlet. Internet

sites, as well as print and social media picked up the story, but soon it was clear that the interest was more prurient than purely scientific. The radio segment was titled “Weird Fern Shows the Power of Interspecies (sic) Sex.” Quick to follow were “...the freak fern...isn’t rare,” “...the love between two ferns knows few bounds,” and “...new findings have fern researchers *frontic*.” As one who has indulged in fern puns herself, and who answers to the epithet “*fernatic*,” I am not opposed to whipping up enthusiasm for my favorite plants by any legal, non-violent means. Quite apart from the comedic media coverage, *xC.r.* deserves serious attention for its many valuable lessons in plant biology and evolutionary process, especially as they apply to our fern flora.

SOME BACKGROUND

Uniquely among plants the fern life cycle alternates between two, separate, free-living, and very different-looking bodies. The familiar, perennial garden fern is the **sporophyte** plant. It has a complex, three-dimensional body with roots, stems, leaves (fronds) and vascular tissues (xylem and phloem). At maturity it produces sporangia (typically on the underside of fronds) as tiny eruptions of protective jacket cells surrounding a cluster of spore mother cells (sporocytes). Each sporocyte undergoes a special, double division process (meiosis), producing four daughter cells (spores) with new combinations and half the number of chromosomes of its parent. The sporangia are usually snuggled together in distinctive clusters (sori) that may be covered with a protective indusium (flap of leaf tissue). Ripe spores are catapulted out of dehiscent sporangia and dispersed mostly by wind. Some land on suitably shaded, moist substrata (clay banks, rotting wood, rock crevices, etc.) and germinate into tiny **gametophyte** plants. Sexual reproduction and occasional hybridization are the purviews of these gamete (egg and sperm) producing plants.

At maximum size a typical fern gametophyte is about as big as a pinky fingernail. It is typically a simple, two-dimensional, photosynthetic thallus - one-to-several cells thick - and resembles a bit of green tissue paper or seaweed. At maturity it is usually heart-shaped (appropriate for its sexual reproductive mission!), although strap-shaped gametophytes are common, especially in epiphytic species, and a few ferns have non-green, subterranean types with mycorrhizal partners. On its underside a typical gametophyte produces flagellated sperms within an embracing coat of jacket cells (the antheridium), alternating with eggs, each surrounded by a vase-shaped jacket (the archegonium). All the nuclear divisions that produce these little-reproductive parts are formed through “equal” nuclear divisions (mitosis), so eggs and sperms have the same number and types of chromosomes as the body cells of the thallus. Seldom are ripe sperms and eggs present at the same time on a thallus, which favors cross-fertilization and the evolutionary benefits of gene flow within and among populations of the same species. Sperm cells, released from antheridia, require a film of surface water in which to swim toward and down the chemically beckoning necks of archegonia. Malic acid is known to lure bracken sperm. A fertilized egg (zygote) grows quickly into a spherical embryo, securely anchored to the parent gametophyte. Rapid growth produces hormones that suppress the development of additional zygotes on the gametophyte. A burgeoning embryo needs the limited nutritional resources of its parent’s photosynthesis

to form the first root and shoot of a new, baby sporophyte. A charming sight is that of a gametophyte with an attached baby sporeling emerging into the light. The ungrateful offspring achieves independence as it kills its parent with shade and growth inhibitors.

Hybrids form when a sperm cell from one species fertilizes an egg of a different species and the resultant zygote develops into a new taxon, bearing the DNA (and traits) of both parental donors. Most such pairings occur between closely related species. That generally implies the parent taxa were not isolated long enough to have evolved complete physical and/or chemical barriers to reproductive compatibility. If such barriers are incomplete and penetrable, hybridization can reunite lineages (populations, subspecies, species, or genera), slowing or foiling the progression of new species formation.

Most hybrids, including *xC.r.*, are sterile. Their parental (homologous) chromosomes are almost certain to be different in number and/or content, resulting in failure to match up with each other in the first phase of meiosis. In fact, the presence of shriveled or empty spores is one way to identify fern hybrids in the field (with magnification). Another is to look for characters (traits) that appear to be intermediate between those of their putative parents. For example, the Susquehanna fern (*Dryopteris goldiana* X *D. marginalis*) produces sori half way between the pinnule veins (where they are in *D. goldiana*) and the pinnule margins (their location on *D. marginalis*). *xC.r.* has the complex frond branching of *Gymnocarpium* and the overall frond architecture of *Cystopteris*. The parental genera had evolved adaptations to different habitats, *Gymnocarpium* to forested areas and *Cystopteris* to rock ledges at higher elevations, seeming to preclude comingling. However, both have worldwide distributions in North America, Europe and parts of Asia. Moreover, spores are known to travel great distances on storms before settling down to start populations of disjunct gametophytes.

SOME LESSONS FROM *xCystocarpium roskamianum*

- *xC.r.* is an intergeneric hybrid between distinctive and well recognized genera (*Cystopteris* and *Gymnocarpium*), different enough that until recently they were placed in separate families. Now they are both nested together in the Cystopteridaceae. Generic hybrids are rare in nature but several are known, e.g. *xDryostichum singulare*, the nothogenus of a cross between *Dryopteris goldiana* and *Polystichum lonchitis* known from the Georgian Bay area of Ontario, Canada. Like *xC.r.*, *xD. singulare* is sterile.
- In the case of *xC.r.*, the parental genera had been separating from their common ancestry for 60 million years, establishing an amazing compatibility record - what Rothfels et al.* call an “extraordinarily deep hybridization event.” The researchers used Bayesian analyses of chloroplast DNA sequences to estimate the divergence time for *xC.r.*’s ancestral genera. Others have shown that reproductive barriers in isolated species of the fruit fly genus *Drosophila* are complete in about 4 million years (the time required for mutational differences to accumulate and make them no longer able to interbreed or hybridize). Flowering plant species of the blue-eyed Mary genus *Collinsia* appear to reach total incompatibility after 5 million years of

separation, and the deepest hybridization known for flowering plants is between the grass genera *Hordeum* and *Secale* (14 million years). Remaining inter-fertile after 60 million years of divergence for the parental lineages of xC.r. is a new record and shows that ferns have remarkably slow “speciation (incompatibility) clocks.”

- Chloroplast DNA analysis indicates that *Gymnocarpium dryopteris* is the female parent of the new hybrid. Chloroplasts are the photosynthetic organelles that lie between the nuclear and cell membranes of plant cells. Thus, they are inherited solely through the egg since sperms contribute only nuclear (chromosomal) DNA to the zygote. Chloroplasts (and mitochondria) have their own DNA because they were once (so the theory goes) free-living, prokaryotes - bacteria that were “gobbled up” by early eukaryotes - “true” cells with nuclear membranes that contain and protect DNA and histone proteins (chromosomes). The captured prokaryotes and their DNA were retained as efficient organelles for carrying out the vital energy cycles of photosynthesis and respiration. They also replicate along with the nucleus when the cell divides.
- The *Gymnocarpium dryopteris* parent of xC.r. is itself of hybrid origin (between *G. appalachianum* and *G. disjunctum*), but it became fertile through allopolyploidy (spontaneous doubling of chromosomes that sometimes occurs in sporangia and restores the pairing of related chromosomes that is essential to viable spore formation). The taxonomic background of the *Cystopteris fragilis* parent is also complex. It is described as an “actively speciating polymorphic polyploid” in *The Flora of North America*, Vol. I., 1993. Hybridization is made even more complex by the tendency of hybrids to backcross with their parents - promiscuity and incest combined!

Even though most hybrids are sterile, they are not limited to occasional reproductive restoration through allopolyploidy. Sporophyte plants can produce millions of spores, and, among the sterile majority from a typical hybrid, a few spores may be fertile, and grow into gametophytes under favorable conditions. In addition, sporophytes have many options for asexual propagation, e.g., rhizome branch separation, apical division, bulbils, and even apospory (the production of gametophytes directly from leaf tissue, without meiosis or spores). Gametophytes also employ various means of vegetative reproduction, including apogamy (the production of sporophyte plants from ordinary cells of the thallus - particularly from cells near the meristematic growth “notch.”). For xeric (e.g. desert) ferns it side-steps the water requirements of motile sperms while maintaining population levels under dry conditions. Diploid gametophytes often generate apogamous sporophytes that can make viable spores. Any of these methods will produce clones that allow for short- or mid-term survival in changing environments and are also very useful to horticulturists. For the long term, nothing equals the adaptive advantage of gene mixing through sexual reproduction within populations, and that is true for nearly all organisms.

Fern gametophytes and sporophytes may look like entirely different organisms, but they are merely different manifestations of a common genome. Apogamy

and apospory demonstrate how fluidly their cells can “morph” between the two body types of the fern life cycle. This developmental mystery is incompletely understood. It used to be explained in Botany 101 by their different ploidy levels – the gametophyte having one complete set of chromosomes (haploid or $1n$) and the sporophyte with two sets (diploid or $2n$). However, fully functional haploid, diploid, triploid, tetra- and hexaploid gametophytes and/or sporophytes are known or can be created in laboratories. Expression of the fern genome appears to be less affected by numbers of chromosome sets or gene copies than by light, sugars, other nutrients, gene regulation (activation and suppression), and the physical environment (free-living for a spore versus constrained by the turgor pressure of an archegonium for a zygote).

It appears that *xC.r.* is the result of a relatively recent hybridization event (within the past 15-20 years) between two parental genera of truly ancient genealogy. Fortunately for nursery owners and covetous gardeners, its rhizomes grow vigorously, forming mats that can be separated to make lots of plants for the horticultural trade. The new hybrid was discovered about a dozen years ago when a fern hobbyist - Harry Roskam of the Netherlands - was on vacation in the French Pyrenees and collected a piece of *Phegopteris connectilis* (narrow beech fern) for his garden. It became obvious that fronds of a second fern were unfurling from the intermingled rhizome mat. The new find remained unidentified for over a decade until the renowned taxonomist Chris Fraser-Jenkins confirmed it as a cross between *Cystopteris* and *Gymnocarpium*. **

To explain the “slow speciation clock” or “low birthrate of new species” in ferns one has to look to the free-living gametophyte. This simple, thalloid holdover from a more aquatic past has changed little over 350 million years of land plant evolution. Its original, single set of chromosomes (the haploid or base number for each species) has doubled, even quadrupled in some cases, bestowing some gene redundancy with which to counter damaging or lethal mutations. Its sexual prowess, however, is still dependent on flagellated sperms swimming to eggs in surface water. There are few pre-zygotic barriers in such a basic system and sperm/egg fusions between different taxa remain high. Incompatibilities evolve slowly, allowing even deep hybrids like *xC.r.* to emerge in the wild. Mature hybrids often display varying degrees of “hybrid vigor,” - more robust sporophyte bodies and larger over-all sizes. The brakes get applied just prior to spore production, when meiosis is usually stifled by the failure of the different parental chromosomes to pair up successfully (unless allopolyploidy occurs, which does happen occasionally in nature and can be induced regularly in research laboratories).

- According to Rothfels et al.,* “One reason we live in a world with more than 250,000 species of flowering plants but only around 10,000 fern species....may just be that populations of non-flowering lineages (e.g. *ferns*) take longer to achieve complete genetic separation from one another because they have fewer mechanisms to prevent the sperm of one species from encountering the egg of another.” Flowering plants (angiosperms) also have a gametophyte stage (it’s the only botanical way to have a

sex life). However, their gametophytes are examples of extreme minimalism - mere cytological (cellular) stages - completely contained within the protective, nutritive embrace of the sporophyte's flowers (collections of highly modified leaves - sepals, petals, stamens, pistils). The microscopic gametophytes are of two types, male and female. The male gametophyte (called a pollen tube) germinates from a microspore (pollen grain), **grows** toward an 8-nucleated sac (the vestige of a female gametophyte) at the base of the pistil, and releases a couple of non-flagellated sperm nuclei next to the egg nucleus. Eventually an embryo surrounded by stored food (endosperm) and protective layers forms a seed - a sort of space capsule with dispersal, dormancy, and other great survival tools. No longer needed are ephemeral, free-living gametophytes or undependable rainwater supplies for swimming sperms.

- Barriers to fertilization between species in flowering plants are numerous. Except for wind or water pollinated plants, pollen is typically gathered and transferred within con-specific flowers by insects, slugs, birds, and bats recruited with enticing odors, colors, and nectars. A foraging bee behaves like an addict, seeking satiety through loyal flitting among the blooms of, say, a beebalm (*Monarda*) population, dependably cross-pollinating its flowers. Some pollinators (especially moths and hummingbirds) have co-evolved body parts exclusively fitted to the shape of certain flowers or are active only during parts of the day or season when their preferred flowers bloom (the implications of this in a period of climate change need to be studied). If foreign pollen lands on the tip (stigma) of a floral pistil there may be hairs, slippery exudates, or other barriers to prevent adherence or germination. Tissue incompatibilities may stifle growth of the pollen tube or fertilization of the egg. These barriers and many others serve to isolate the gametophytes of different angiosperm taxa, but allow normal gene flow within and between populations of the same species. Subsequent isolation and mutation create new species (rather than re-uniting differing lineages) at the pace of a much faster evolutionary clock. Evolution, at the species level, is a balancing act between unrestricted gene flow, which often brings diverging populations back together (slowing or reversing the speciation process, as in ferns) and barriers to free gene flow (as in angiosperms). The latter tends to maintain heritable differences that develop in isolated populations, propelling them onward to new species formation and the incredible number of flowering plants in modern floras. Hybridization (broadly defined) may reverse the speciation pathway at any point until reproductive incompatibility is truly complete. It is the nature of biology to eschew absolutes and to retain all those maddening (I would say challenging) exceptions and variations.

Any time the serendipitous discovery of a new hybrid fern with 60 million-year old parental pedigrees inspires us to think through so many botanical lessons, I say “*FERNTASTIC*,” and thank you x*Cystocarpium roskamianum*.

ACKNOWLEDGMENT

Comments and corrections made to the text by Dr. Carl J. Rothfels and permission to use the photo of x*Cystocarpium roskamianum* with its two parents greatly improved this article and are acknowledged with much personal appreciation.

* Rothfels, Carl R., et al. 2015. Natural hybridization between genera that diverged from each other approximately 60 million years ago. *The American Naturalist* 185(3): 433-442.

**Roskam, Harry. Fall 2014. *xCystocarpium roskamianum*, a weird one? *Hardy Fern Foundation Quarterly* 25(4): 79-81.



xCystocarpium roskamianum (middle) flanked by its parents *Gymnocarpium dryopteris* (left) and *Cystopteris fragilis* (right).

Appendix from C.J. Rothfels et al.,* with permission.

An Anomaly, revisited

Jo Laskowski

Seattle, WA

a•nom•a•ly (ə-nŏm ' ə-lē) *n., pl. -ilies.* 1. Deviation or departure from the normal or common order, form, or rule. 2. One that is peculiar, irregular, abnormal, or difficult to classify. 3. Something that is unusual enough to be noticeable or seem strange.

If you were raised on television episodes of Rod Serling's "The Twilight Zone," you know about anomalies. Anomalies, those places apart from the ordinary fabric of existence, where things exist that don't anywhere else.

In August 2008, I went to such a place. I was part of a group of Hardy Fern Foundation members and staff. Led by Tim McNitt, we hiked the Perry Creek trail in the North Cascade Mountains of Washington state and looked at its ferns. The North Cascades

are a complex place. Western Washington state sits on the leading edge of a westward traveling continental plate, and we ride over an eastward traveling Pacific plate that plunges beneath us. We're a mess of accrued bits and pieces of islands and odd plates that we've plowed into, with lots of volcanoes thrown in. The geologic chaos from folding and faulting and mountain building was then briskly remodeled by glaciers during the Ice Age. It's a young, raw area, kept well-watered by a meteorological phenomenon called the Puget Sound convergence zone. In the classically soggy Northwest, this is an area even more soggy. (see photo page 75)

What makes Perry Creek noteworthy among the dozens of creeks on the western slopes of the North Cascades is its startling number of fern species, some of which are rare. There are unique assemblies of hardwoods and conifers, too, like big-leaf maple (*Acer macrophyllum*) with Alaska cedar (*Chamaecyparis nootkatensis*) with subalpine fir (*Abies lasiocarpa*)—growing within just feet of each other. There are predictable groupings of vegetation in all the creek valleys in these mountains, and then there is Perry Creek, the outlier, a place apart from the ordinary fabric of existence, where things exist that don't anywhere else. You can find early documents and surveys attesting to its irregularity. One of the reference documents for the 2008 trip was compiled from a 1976 report by noted NW botanist, Art Kruckeberg, and a 1983 report by a young taxonomist and field botanist named Ed Alverson.

The trail was a beauty, too, even without the draw of a botanical anomaly. Wide talus slopes cascaded down the steep valley walls. Across the valley, waterfalls shimmered on the sheer rock faces. Patches of old growth forest gave intermittent shade. The trail was rocky, well-used, narrow. The elevation gain was steep in places, but moderate overall. Most of what we came looking for was close to the trail. And we found *Botrychium*, *Dryopteris*, *Polypodium*, *Athyrium*, *Adiantum*, *Cryptogramma*, *Blechnum*, *Polystichum*.

In July 2015, I had the opportunity to revisit Perry Creek. This time it would be a bit different. This time I knew incrementally more about ferns. This time I would be part of a group taking a 2-day workshop on Fern and Fern Allies Identification. The workshop was co-sponsored by the WA Native Plant Society, and the Burke Museum's University of Washington Herbarium.

Day One...

...we had lab time in the botany building on the UW campus. With dissecting microscopes at our disposal—guess what's on my Christmas list?—we looked at an amazing 49 fresh fern species. Most of the material was provided by Ed Alverson and Peter Zika, the instructors. Some of it came from workshop participants, including a notable pan of *Onychium japonicum* gametophytes and young sporophytes. That's not something a lot of people ever get to see.

Ed and Peter were great. They were comfortable lecturers, able question-answerers, and nimble-footed field botanists and taxonomists. At the door to the lab, we left behind words like "stem" and "leaf" and "frothy", and learned "rachis" and "stipe" and "pinna" and "tripinnate-pinnatifid." We slogged our way through a dichotomous key revision

for the second edition of “Flora of the Pacific Northwest,” the work of Ed Alverson and others. The key hasn’t been published yet, and we were very privy beta testers! We took turns reading it aloud as we worked with the samples. Since the revision didn’t come with a glossary, we capably improvised as we tackled the abbreviations. Although we soon learned that **per** did not stand for “person” but rather “perennial,” and **pls** meant “plants,” not “please,” and **gen** did not refer to “Generation Anything”, but did mean “generally.” Our verbal renderings were slightly more fluid by day’s end, and it ended with a tour through the Botany greenhouse, close at hand. I’m such a sucker for the mucky smell and humidity of old glass houses...

Day Two...

...found us on the Perry Creek trail by about 10AM. We were seventeen in number, including our wranglers, Peter, Ed, and Ben Legler. Ben was also a taxonomist and intimately familiar with the area. He had revised the Botrychium section of our key. It would be a good thing that he was along. Right off, it got interesting. We were hiking on Wednesday, July 29th. The previous Sunday, Ed and Peter had hiked the trail to scout it for the workshop. We in the Pacific Northwest had been broiling under a record-busting heat wave this summer, and the exceptionally dry period might have put the kibosh on our scheduled fern botanizing. They literally saw nothing on that Sunday trip, and it had been accompanied by a steady mist.

Amazingly, by Wednesday that little bit of moisture treated us to an explosion of ferns and allies, twenty-four in total. Most impressive were sightings of three of the glorious and rare grape ferns and moonworts. Without the educated eye of wrangler and reviser Ben Legler it’s doubtful the rest of us would have ever even seen them. One he spotted was so slightly unfurled as to be no more than a scuff on the surface of the duff. But according to the revision, two of our sightings no longer bear the name Botrychium. One is now classified as Scepstridium, and the other as Botrypus. Sigh. Back at home that night I dreamed about moonworts.

So anomalous, so precious, so amazing is this area that it was (finally, belatedly) designated a Natural Resource Area in 1997, a designation that protects the unique assemblage of habits and plants from intrusion and “improvement.” The general hiker and the occasional ferning group alike are lucky indeed to have access to this area—I walked up two blisters, and it was so worth it!

We are pleased to report that Ed Alverson has agreed to be our guest speaker at our 2016 Fern Festival.

Polypodium

Tupfelfarne: Arten, Sorten, Kultur

Berndt Peters

Schleswig, Germany

Reviewed by Sue Olsen
Bellevue, WA
USA

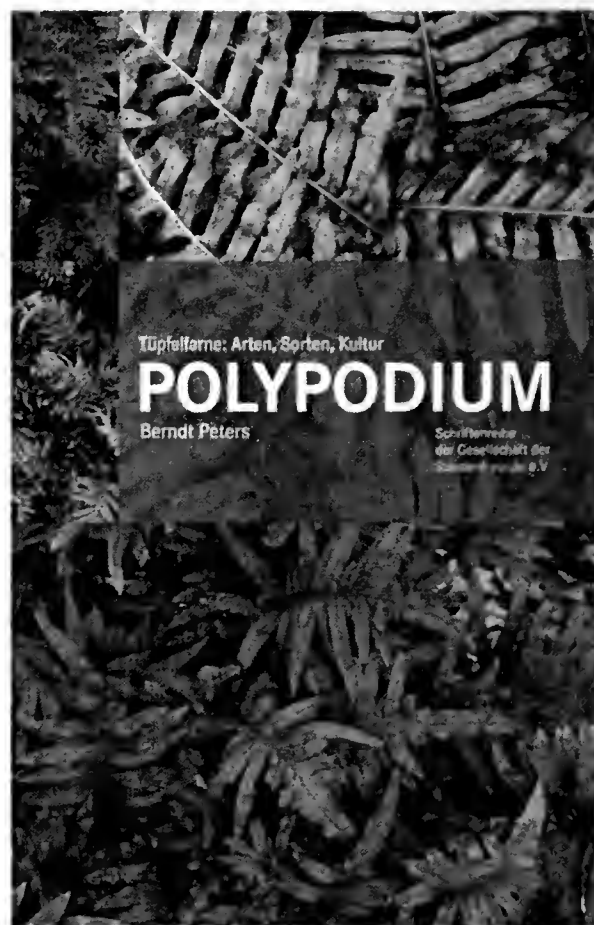
Berndt Peters has long been a friend and for me a much respected fern expert. So it was a delight to recently receive his newly published book on polypodiums. Appropriately enough it is in German, but I quickly found that I did not need to read German in order to appreciate and learn from this excellent work.

The book is 120 pages long of which 113 pages are devoted to informative and handsomely illustrated descriptions of and cultural advice on 16 species and hybrids along with 50 cultivars. (There's a *Polypodium* for everyone!) The photos are excellent and in addition to showing the details of frond outlines give them scale by positioning a measuring stick adjacent to the illustration of the frond's silhouette. Of further help there are a number of informative tables included which give comparative information on when, where and by whom the plant was discovered as well as diagrams showing the parentage of hybrids.

In the back matter the reader will find a list of a number of cultivars that are not included along with a reference to where they are in literature. Additionally there is a glossary, an extensive list of references, a European Hardiness Plant Zone Map and finally a list of fern nurseries and an accompanying list of fern organizations with their web site addresses.

The book is available from
Gesellschaft der Staudenfreunde (GdS)
info@gds-staudefreunde.de
Price 24 Euros includes shipping to the US

Thank you, Berndt, for your informative and well-illustrated contribution to our fern knowledge.



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